Havre, 49; Roseburg, 48; Bismarck and Winnemucca, 46; Pierre, Idaho Falls, Carson City, and San Luis Obispo, 45. The smallest values were: Hatteras, Key West, and Galveston, 14; Jupiter, 15; Nantucket, Block Island, and Tatoosh Island, 16; Eastport and Kittyhawk, 19; Charleston and Point Reyes Light, 20.

Among the *extreme monthly ranges* the largest were: Bismarck and Huron, 71; Pierre, 70; Moorhead, 68; Williston and Cheyenne, 64. The smallest values were: Key West, 18; Jupiter, 19; Point Reyes Light, 21; Eureka, 25; Tatoosh Island and San Diego, 26.

The *accumulated monthly departures* from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures are given in the third column for comparison with the departures of current conditions of vegetation from the normal condition.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
Middle Atlantic	+ 4.7	+ 0.5	New England	— 0.1	— 0.0
South Atlantic	+11.5	+ 1.3	Florida Peninsula	—11.1	— 1.2
East Gulf	+ 2.9	+ 0.3			
West Gulf	+13.0	+ 1.4			
Ohio Valley and Tenn.	+11.0	+ 1.2			
Lower Lake	+ 9.5	+ 1.1			
Upper Lake	+20.7	+ 2.3			
North Dakota	+ 5.0	+ 0.6			
Upper Mississippi	+19.0	+ 2.1			
Missouri Valley	+18.9	+ 2.1			
Northern Slope	+ 6.2	+ 0.7			
Middle Slope	+24.2	+ 2.7			
Abilene (southern Slope)	+25.6	+ 2.8			
Southern Plateau	+ 6.5	+ 0.7			
Middle Plateau	+ 0.8	+ 0.1			
Northern Plateau	+15.3	+ 1.7			
North Pacific	+ 1.9	+ 0.2			
Middle Pacific	+ 0.6	+ 0.1			
South Pacific	+ 2.9	+ 0.3			

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight of the vapor coexisting with the air contained in a cubic foot of space, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-point for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, is given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer; an evaporometer may be so constructed as to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effects of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Measurements of evaporation within the thermometer shelters are difficult to make so as to be intercomparable at temperatures above and below freezing, and they may be replaced by computations based on the wet-bulb temperatures. The absolute amount of evaporation from natural surfaces not protected from wind, rain, sunshine, and radiation, are being made at a few experimental stations and will be discussed in special contributions.

Sensible temperatures.—The sensation of temperature experienced by the human body and ordinarily attributed to the condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. A satisfactory expression for the relation between atmospheric conditions and nervous sensations has not yet been obtained.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was heaviest, viz, above 8 inches, in a small region on the southern peninsula of Florida; in central Texas; on the coast of Nova Scotia near Halifax, and the coasts of Massachusetts and Maine.

The larger values at regular stations were: Halifax, 12.1; Port Eads, 10.7; Portland, Me., 9.6; Block Island, 7.8; Bermuda, 7.2.

Details as to *excessive precipitation* are given in Tables XII and XIII.

The *diurnal variation*, as shown by tables of hourly means of the total precipitation, deduced from self-registering gauges kept at the regular stations of the Weather Bureau, is not now tabulated.

The *current departures* from the normal precipitation are given in Table I, which shows that precipitation was in excess over the lower Lake Region, the Ohio, Mississippi, and Missouri valleys, the eastern Rocky Mountain Slope, New England, and the Canadian Provinces. It was deficient on the Pacific Coast and in the Gulf and South Atlantic States. The large excesses were: Halifax, 8.6; Portland, Me., 6.5; Block Island, 4.8; Port Eads, 4.5. The large deficits were: Jacksonville, 6.2; Tatoosh Island, 5.7; Jupiter, 4.1; Savannah and Galveston, 4.0.

The *average departure* for each district is given in Table I. By dividing each current precipitation by its respective normal the following corresponding percentages are obtained (precipitation is in excess when the percentage of the normal exceeds 100):

Above the normal: New England, 172; Ohio Valley and Tennessee, 141; lower Lake, 138; upper Lake, 126; North Dakota, 129; Upper Mississippi, 128; Missouri Valley, 116; northern Slope, 182; middle Slope, 123; southern Slope, 143; southern Plateau, 138.

Normal: West Gulf, middle Plateau, and middle Pacific, 100.

Below the normal: Middle Atlantic, 92; south Atlantic, 53; Florida Peninsula, 76; east Gulf, 74; northern Plateau, 31; north Pacific, 38; south Pacific, 17.

The *total accumulated monthly departures* from normal precipitation from January 1 to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
Lower Lake	+ 3.60	114	New England	— 2.70	92
North Dakota	+ 1.50	109	Middle Atlantic	— 3.10	91
Upper Mississippi	+ 1.70	106	South Atlantic	— 9.80	78
Missouri Valley	+ 0.20	101	Florida Peninsula	— 2.00	95
Northern Slope	+ 0.70	106	East Gulf	— 8.20	82
Southern Plateau	+ 0.60	110	West Gulf	— 9.70	71
Middle Plateau	+ 3.10	136	Ohio Valley and Tenn.	— 2.30	94
North Pacific	+ 2.60	107	Upper Lakes	— 1.30	95
Middle Pacific	+ 2.80	114	Middle Slope	— 2.10	89
			Abilene (southern Slope)	— 5.20	74
			Northern Plateau	— 0.50	96
			South Pacific	— 2.00	76

The *years of greatest and least precipitation* for September are given in the REVIEW for September 1890. The precipita-

tion for the current month was the greatest on record at: Portland, Me., 9.57; Indianapolis, 8.17; Block Island, 7.76; Rapid City, 2.58; Pueblo, 1.41. It was not the least on record at any regular station of the Weather Bureau.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 11. California, 6, 22. Colorado, 2, 3, 7, 9, 17, 21, 22, 24. Connecticut, 19. Georgia, 4. Idaho, 22, 23. Illinois, 2, 5, 14, 16, 18, 19, 26, 28. Kansas, 4, 8, 24. Kentucky, 17, 18, 24. Maryland, 20. Massachusetts, 9, 19. Michigan, 12. Mississippi, 12. Missouri, 4, 5, 16, 17, 18, 20, 27. Montana, 22. New Jersey, 3, 17, 19. New Mexico, 17, 23. New York, 17, 19. North Carolina, 11, 12, 19. North Dakota, 1, 12, 14, 15, 18. Ohio, 5. Pennsylvania, 17. Rhode Island, 17. South Dakota, 16. Tennessee, 19. Utah, 1, 8, 9, 11, 22 to 25. Virginia, 3, 18. Washington, 12, 15. West Virginia, 19. Wyoming, 25.

SLEET.

The following are the dates on which sleet fell in the respective States:

California, 22. Colorado, 9, 18, 26. Michigan, 18, 19, 21. Minnesota, 18. Missouri, 28. Montana, 8, 15, 25, 26. New Hampshire, 24.

WIND.

The *prevailing winds* for September, 1896, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart IV, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

HIGH WINDS.

Maximum wind velocities of 50 miles or more per hour were reported during this month at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Block Island, R. I	9	75	ne.	Hatteras, N. C.	23	51	n.
Do	10	60	ne.	Jacksonville, Fla.	29	70	se.
Do	13	51	ne.	Kittyhawk, N. C.	23	58	ne.
Buffalo, N. Y	6	50	sw.	Do	30	55	sw.
Do	19	57	w.	Lexington, Ky.	30	56	sw.
Do	30	52	sw.	Nantucket, Mass	9	50	e.
Charleston, S. C	29	62	s.	Do	10	55	s.
Cleveland, Ohio	19	54	w.	New York, N. Y.	30	56	se.
Fort Canby, Wash.	30	52	s.	Savannah, Ga.	29	70	se.
Harrisburg, Pa.	30	72	s.	Washington, D. C.	29	66	se.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 19 regular stations of the Weather Bureau by its photographic, and at 24 by its thermal effects. At one station records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric records show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of the clearness of the sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary when the duration of cloudiness is alone desired, as is usually the case.

The average cloudiness of the whole sky is determined by numerous personal observations at all stations during the daytime, and is given in the column "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table XI.

Difference between instrumental and personal observations of sunshine.

Stations.	Apparatus.	Total possible duration for the whole month.	Personal estimated area of clear sky.	Instrumental record of sunshine.			
				Photographic.	Difference.	Thermometric.	Difference.
		Hrs.	%	%	%	%	%
Bismarck, N. Dak.	P.	376.9	56	57	+ 1	.....	.....
Helena, Mont.	P.	376.9	54	60	+ 6	.....	.....
Portland, Oreg.*	P.	376.1	65	63	− 2	.....	.....
	T.	376.1	65	.....	.....	63	− 2
Eastport, Me.	P.	375.8	31	42	+ 9	.....	.....
Minneapolis, Minn.	T.	375.8	.....	.....	.....	53	.....
Northfield, Vt.	P.	375.4	37	43	+ 6	.....	.....
Portland, Me.	T.	375.4	35	.....	.....	50	+15
Buffalo, N. Y.	T.	375.0	42	.....	.....	56	+14
Rochester, N. Y.	T.	375.0	42	.....	.....	49	+ 7
Boston, Mass.	T.	374.5	42	.....	.....	51	+ 9
Chicago, Ill.	T.	374.5	45	.....	.....	56	+11
Cleveland, Ohio	P.	374.5	39	.....	.....	.....	.....
Des Moines, Iowa	T.	374.5	48	.....	.....	51	+ 3
Dubuque, Iowa†	T.	374.5	39	.....	.....	.....	.....
Detroit, Mich.	T.	374.5	48	.....	.....	58	+10
Cheyenne, Wyo.	P.	374.0	45	61	+16	.....	.....
Eureka, Cal.	P.	374.0	44	48	+ 4	.....	.....
New York, N. Y.	T.	374.0	48	.....	.....	49	+ 1
Omaha, Nebr.†	P.	374.0	52	61	+ 9	.....	.....
Salt Lake City, Utah	P.	374.0	52	81	+29	.....	.....
Columbus, Ohio	T.	373.6	32	.....	.....	39	+ 7
Denver, Colo.	P.	373.6	55	63	+ 8	.....	.....
Philadelphia, Pa.	T.	373.6	47	.....	.....	64	+17
Baltimore, Md.	T.	373.4	50	.....	.....	54	+ 4
Cincinnati, Ohio	T.	373.4	49	.....	.....	68	+19
Kansas City, Mo.	P.	373.4	47	52	+ 5	.....	.....
St. Louis, Mo.	T.	373.4	46	.....	.....	60	+14
Washington, D. C.	P.	373.4	59	60	+ 1	.....	.....
Dodge City, Kans.	P.	373.0	58	66	+ 8	.....	.....
Louisville, Ky.	T.	373.0	48	.....	.....	58	+10
San Francisco, Cal.	T.	373.0	56	.....	.....	61	+ 5
Fresno, Cal.	T.	372.6	82	.....	.....	88	+ 6
Santa Fe, N. Mex.	P.	372.2	60	68	+ 8	.....	.....
Little Rock, Ark.	T.	372.0	61	.....	.....	73	+12
Atlanta, Ga†	T.	371.8	65	.....	.....	62	− 3
Wilmington, N. C.	T.	371.8	70	.....	.....	81	+11
Phœnix, Ariz.	P.	371.4	72	.....	.....	.....	.....
San Diego, Cal.	P.	371.4	79	75	− 4	.....	.....
Savannah, Ga.	P.	371.4	72	71	− 1	.....	.....
Vicksburg, Miss.	T.	371.4	77	.....	.....	79	+ 2
New Orleans, La.	T.	370.4	61	.....	.....	61	0
Galveston, Tex.	P.	370.4	63	71	+ 8	.....	.....

*Record by both methods.

†The personal estimates are for 30 days but the instrumental records are for 28 days only, for which the total possible was 347.8 hours.